Health and Safety
Commission

**Approved Code
of Practice**

Packaging of dangerous substances for conveyance by road.

Classification, Packaging and Labelling of Dangerous Substances Regulations 1984

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Preface

Under the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984, the supplier of a substance which is dangerous for supply and the consignor of a substance which is dangerous for conveyance shall ensure that when the substance is supplied or conveyed by road, as the case may be, it is in a package which is suitable for that purpose, and in particular, that it meets certain requirements.

This Code of Practice gives practical guidance on the packaging of substances which are dangerous for conveyance for the purpose of their conveyance by road. It is one of a series of two, relating to the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984. The series comprises:

- Classification and Labelling of Substances Dangerous for Supply and/or Conveyance by Road.
- Packaging of Substances Dangerous for Conveyance by Road.

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Notice of Approval

By virtue of Section 16(1) of the Health and Safety at Work etc Act 1974 and with the consent of the Secretary of State for Employment the Health and Safety Commission has on 8 August 1984 approved the Code of Practice *Packaging of Dangerous Substances for Conveyance by Road.*

The Code of Practice is approved for the purpose of providing practical guidance with respect to the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984.

The Code of Practice comes into effect on 12 September 1984 which is the date when the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984 come into operation.

Signed

C JOHNSON

Secretary to the Health and Safety Commission

Approved Code of Practice

Introduction

1 This Code of Practice has been drawn up on the basis of joint consultation between representatives of the Confederation of British Industry, the Trades Union Congress, the Local Authorities, Government Departments and the Health and Safety Executive.

2 The Code has been approved by the Health and Safety Commission, with the consent of the Secretary of State, under Section 16(1) of the Health and Safety at Work etc Act 1974 for the purpose of giving practical guidance in relation to Regulation 7 of the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984 in so far as that Regulation relates to the packaging of dangerous substances for conveyance by road.

3 Although failure to comply with any provision of this Code is not in itself an offence, that failure may be used in criminal proceedings as evidence that a person has contravened a regulation to which the provision relates. In such a case however it will be open to that person to satisfy the court that he has complied with the Regulation in some other way.

4 Words and expressions which are defined in the Health and Safety at Work etc Act 1974 or in the Classification, Packaging and Labelling of Dangerous Substances Regulations 1984 have the same meaning in this Code unless the context requires otherwise.

Packaging requirements

5 Regulation 7 relates to both supply and conveyance. So far as this Code of Practice is concerned, it requires the consignor of a substance which is dangerous for conveyance to ensure that, when the substance is conveyed by road it is in a package which is suitable for that purpose, and in particular, that -

"(a) the receptacle containing the dangerous substance, and any associated packagings, are designed constructed, maintained and closed so as to prevent any of the contents of the receptacle from escaping when subjected to the stresses and strains of normal handling, except that this sub-paragraph shall not prevent the fitting of a suitable safety device;

(b) the receptacle and any associated packagings, in so far as they are likely to come into contact with the dangerous substance, are made of materials which are neither liable to be adversely affected by that substance nor liable in conjunction with that substance to form any other substance which is itself a risk to the health or safety of any person; and

(c) where the receptacle is fitted with a replaceable closure, that closure is designed so that the receptacle can be repeatedly re-closed without its contents escaping."

6 The overall duty placed on the consignor relates to suitability for purpose and refers to the *package* which is liable to be individually handled during the course of conveyance by road. As so defined by Regulation 2(1), the package includes the *receptacle* containing the substance and any other *packagings* associated with it and any pallet or other device which enables more than one receptacle containing a dangerous substance to be handled as a unit, but does not include a freight container (other than a tank container), a skip, a vehicle or other article of transport equipment.

7 The particular requirements of Regulation 7 relate more specifically to the receptacle containing the substance and, when applicable, any packagings associated with it. The terms 'receptacle' and 'packagings' are defined by Regulation 2(1) as:

receptacle, in relation to a dangerous substance means a vessel, or the innermost layer of packagings, which is in contact with the substance and which is liable to be individually handled when the substance is used and includes any closure or fastener;

packagings, in relation to a dangerous substance means, as the context may require, the receptacle or any components, material or wrappings associated with the receptacle for the purpose of enabling it to perform its containment function or both.

8 Additional guidance on the usage of the terms package, packagings and receptacle within this Code is given in Appendix 2 in the form of a comparison with international recommendations or rules.

Scope

9 The advice given in Part 1 of this Code has general application to all sizes and types of package within the scope of the Regulations.

10 The question of suitability for purpose may also need to be related to the specific nature of the substance to be consigned for conveyance by road, in particular in the case of those substances which may present varying degrees of hazard according to the manner or quantity in which they are packaged. Advice on suitable means for packaging such substances is given in Part 2 of this Code.

11 The recommendations made, as the case may be in Parts 1 and 2, shall not be taken however to prejudice any requirements imposed by or under any enactment, or any other guidance issued in that connection, which relates to:

(a) gas cylinders;
(b) tank containers having a capacity of $3m^3$ or less;
(c) packages containing a substance possessing radio-active properties;
(d) packages containing a substance possessing explosive properties.

Part 1 General recommendations

1 Packagings used for the conveyance by road of dangerous substances should be of good quality and should be so constructed and closed as to prevent any leakage which might be caused due to normal handling during the conveyance by road. No quantity of a dangerous substance which is sufficient to cause a risk to the health or safety of any person should adhere to the outside of the packagings.

2 Receptacles and other parts of packagings, including their closures, in contact with dangerous substances should not be so affected by any chemical or other action of those substances that they cannot be safely conveyed by road. When necessary, the receptacles, other packagings or closures should be protected by inner liners which are compatible with the dangerous substances, or by suitable inner coating or treatment. Such coating or treatment should be tough and resilient, should adhere to each of the components to be protected throughout and should not itself be liable to be adversely affected by the dangerous substances.

3 The materials used in the construction of receptacles, other parts of packagings or their closures in contact with dangerous substances should not be liable to any reaction with those substances such as to form a product which creates a risk to the health or safety of any person.

Normal handling

4 In considering the design and construction of packagings which are suitable for the purpose of conveying dangerous substances by road, due regard should be given to the stresses and strains which are reasonably to be foreseen or to be expected during the course of normal handling.

5 Typical of the factors which may need to be taken into account are those outlined below.

Dropping of packages

6 Consideration should be given to the height from which packages might be dropped in the course of normal handling. Packagings should be able to withstand being dropped from that height without loss of their contents.

7 In that connection, adequate provision should be made to ensure that packages may be safely lifted, or otherwise handled as may be required, for the purpose of their conveyance by road.

8 Means for lifting or other mechanical handling, when incorporated into the package, should be able to withstand such repeated use as might be anticipated during its service life, without deterioration which could adversely affect safety during conveyance, and without any distortion likely to reduce the strength of the packagings or otherwise lead to loss of containment function.

Stacking of packages

9 Packages should be able to withstand the pressures imposed by any stacking to which they may be subjected during conveyance, without loss of their containment function and without any distortion which is likely to reduce their strength or cause instability in such stacks.

Abrasion or vibration

10 Packagings should be able to withstand any abrasion, vibration or other similar wear and tear as is likely to occur during their service life, without such deterioration as could cause loss of containment function or otherwise affect their safe conveyance.

Effects of weather

11 Packagings should not be subject to any reduction in strength, when wetted, such as is likely to cause loss of containment function or otherwise affect their safe conveyance.

12 Packagings should similarly be able to withstand the foreseen variations in temperature.

13 Consideration should also be given to the likelihood that the materials used in the packaging may be subject to degradation by ultra-violet radiation if used over a prolonged period.

Fragile receptacles

14 Any receptacles which are liable to break or to be easily punctured during conveyance by road, e.g. those made of glass, porcelain, stoneware or some plastics materials, should be secured within outer packagings. Those outer packagings, which may include suitable cushioning materials, should so protect the receptacles from impact that they cannot break, be punctured or leak their contents to any significant degree into the outer packaging, under the normal conditions of conveyance by road. Any leakage of contents from the receptacles should not impair the protective properties of the cushioning materials or of the outer packaging to any extent which is liable to lead to loss of their containment function or otherwise cause a risk to the health or safety of any person.

15 The recommendations made in paras 2 and 3 above, apply equally to cushioning materials. Such materials should be so disposed as to ensure that the receptacles remain surrounded by them; those liable to disintegrate over a prolonged period should be regularly inspected to ensure their continued effectiveness. So far as possible, cushioning materials should not be readily ignitable.

16 Cushioning materials will not be needed if the outer packagings are so designed as to control undue movement of the receptacles within the package and can by that means provide effective protection against impact.

Plastics used for packaging

17 Plastics materials likely to be softened, rendered brittle or permeable due to the chemical action of substances being conveyed, should not be used in any part of the packaging in contact with those substances.

18 Apart from that, the permeability of plastics used for packaging should not be such as is likely to constitute a danger under normal conditions of conveyance by road.

19 Plastics used for packaging should not be subject to any ageing over their service life which is likely to result in loss of containment function or otherwise prejudice the safe conveyance of the contents.

20 The recommendations made at paras 12 and 13 above may have particular relevance to plastics used for packaging.

Packaging of liquids

21 Liquids should only be conveyed in packagings able to withstand any internal pressure likely to be generated during conveyance. Sufficient ullage should be left in the packagings to ensure that neither leakage nor any distortion likely to lead to loss of containment function, will occur as a result of expansion of the liquid caused by a rise in temperature during conveyance.

22 When certain substances need to be wetted for conveyance, the packagings should be effectively sealed to ensure that the level of liquid (water, solvent or phlegmatiser) does not fall below safe limits during conveyance.

Venting

23 Except when venting devices are necessary, packagings should be so sealed as to prevent vapours escaping in any amount likely to cause a risk to the health or safety of any person.

24 Venting devices should only be used when the nature of the substance makes this necessary. For example where pressure might otherwise develop within the packagings due to the emission of gas from the contents, and that gas will not itself prejudice the safe conveyance of the substance.

25 The venting should allow the gases to escape to the atmosphere outside the package. It should be so designed that, when the package is in its correct attitude for conveyance, it does not allow the leakage of the substance being conveyed.

26 The package should, if necessary, be marked to indicate the correct attitude for conveyance.

Mixed packaging

27 Different substances which in the event of contact could react dangerously with one another should not be placed in the same outer packagings.

Repeated use of packagings

28 When any packagings have previously been used for the conveyance of dangerous substances, due consideration should be given to their inspection and, whenever it becomes necessary, their maintenance.

29 The inspection should ascertain, so far as is reasonably practicable, that the receptacle is clean and uncontaminated and that the receptacle and any associated packagings have not been damaged or otherwise adversely affected by earlier contents or earlier conveyance operations.

30 Faults identified should be made good or repaired before the packagings are re-used.

31 Where the receptacle is fitted with a replaceable closure it is important to check the continuing effectiveness of that closure.

Empty packagings

32 Empty packagings previously used to hold a dangerous substance should be treated in the same manner as if they were filled with that substance, until such time as they have been cleaned or purged. The amount of the substance or its vapours which remains after cleaning should not be sufficient to cause a risk to the health or safety of any person.

Part 2
Suitable packagings for particular substances

1 Apart from the factors considered under the general recommendations made in Part 1 of this Code, other factors may need to be taken into account in deciding the suitability of a package for the conveyance by road of certain substances, particularly in relation to any substance which because of its inherent instability or self-reactive nature, may present varying degrees of hazard according to the manner or quantity in which it is packaged.

2 Detailed advice on suitable packagings for specified organic peroxides is set out in Appendix 1 to this Code. The advice of the Health and Safety Executive should be sought when it becomes necessary to consider the conveyance by road, within the meaning of the Regulations, of:

(a) any organic peroxide not yet listed in Appendix 1;

(b) any listed organic peroxide in a form of packaging other than that recommended for that particular substance.

3 So far as other substances of this nature are concerned, advice may again be sought from the Health and Safety Executive. Any detailed recommendations or requirements laid down for the packaging of such substances in relation to international conveyance would normally be considered as suitable.

Appendix 1
Suitable packaging for organic peroxides

A List of organic peroxides

B List of special provisions

C List of recommended packagings

Explanatory notes

1 Reference is made in the list of organic peroxides, in column 3, to any special provisions which may apply and, in column 4, to recommended packagings. The references relate to the lists found at Appendices 1B and 1C.

2 The selection of a suitable form of packaging should take account of any special provisions listed for the organic peroxide concerned.

3 Where a number of packagings may be recommended for a particular substance, it may be found that some will only be suitable for the organic peroxide in a solid state and others suitable when it is in a liquid state.

4 The recommendations made in this Appendix shall not be taken to prejudice any requirements imposed by or under any enactment or any guidance issued in that connection. Particular attention is drawn to the Classification and Labelling of Explosives Regulations 1983 (SI 1983/1140) and to the substances marked (E) in this Appendix. Where the (E) mark appears it indicates that the substance may have explosive properties.

Appendix 1A List of Organic Peroxides

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
	Acetyl acetone peroxide, (3,5-Dimethyl-3,5-dihydroxy-dioxolane-1,2), [not more than 40% in solution]	2080	21	P1a P8 UK1
	Acetyl benzoyl peroxide, [not more than 45% in solution]	2081	21	P1a P8 UK1
(E)	Acetyl cyclohexanesulphonyl peroxide, [not more than 82% wetted with not less than 12% water]	2082	1,22	P1f P13b
	Acetyl cyclohexanesulphonyl peroxide, [not more than 32% in solution]	2083	20	P1b P2d P8 UK1
	tert-Amylperoxy benzoate, [not more than 92% in solution]	3044	21	P1a
	tert-Amyl peroxy-2-ethyl-hexanoate, [technically pure]	2898	22	P1c
	tert-Amyl peroxyneodecanoate [not more than 75% with phlegmatiser]	2891	20	P1c
	tert-Amyl peroxypivalate, [not more than 77% in solution]	2957	20	P1c
	tert-Butyl cumyl peroxide, [technically pure]	2091		P1a P2c P8 P10 P22a P25b UK1
	n-Butyl-4,4-di-(*tert*-butylperoxy) valerate, [not more than 52% with inert solid]	2141		P1b
	n-Butyl-4,4-di-(*tert*butylperoxy) valerate, [technically pure]	2140		P1c P8 P18
	tert-Butyl hydroperoxide, [not more than 72% but more than 90% with water]	2094	7	P1a P8 P10 P22a UK1
	tert-Butyl hydroperoxide, [not more than 72% with water]	2093	2,9	P1a P8 P10 P22a P24 UK1 UK2
	tert-Butyl hydroperoxide, [not more than 80% in di-*tert*-butyl peroxide or] *tert*-Butyl hydroperoxide [not more than 80% in di-*tert*-butyl peroxide and solvent or] *tert*-Butyl hydroperoxide, [not more than 80% in di-*tert*-butyl peroxide or solvent]	2092	7,8,21	P1a P8 P10 P22a P24 UK1
	tert-Butyl monoperoxymaleate, [not more than 55% as a paste]	2101	21	P1a P2c P3b P6a P8 P16 P20c P20d P22a P25b P30 UK1

	Name and description 1	Substance Identification Number 2	Special provisions 3	Recommended Packagings 4
	tert-Butyl monoperoxymaleate, [not more than 55% as a paste]	2100	21	P1a P8 UK1
(E)	*tert*-Butyl monoperoxymaleate, [technically pure]	2099		P15
	tert-Butyl monoperoxyphthalate [technically pure]	2105		P1f P3b P6a P20c P20d P21
	tert-Butyl peroxyacetate, [not more than 52% in solution]	2096	21	P1a P2d P8 UK1
(E)	*tert*-Butyl peroxyacetate, [not more than 76% in solution]	2095	21	P1c P8
	tert-Butyl peroxybenzoate [not more than 50% with inert inorganic solid]	2890	21	P1a
(E)	*tert*-Butyl peroxybenzoate, [technically pure or] *tert*-Butyl peroxybenzoate [more than 75% in solution]	2097	21	P1c P8 P13b P18 UK1
	tert-Butyl peroxybenzoate, [not more than 75% in solution]	2098	21	P1a P2c P8 P10 P22a P25b UK1
	tert-Butyl peroxycrotonate, [not more than 76% in solution]	2183	21	P2d P8 P9
(E)	*tert*-Butyl peroxydiethyl-acetate, [technically pure]	2144	22	P1c
	tert-Butyl peroxydiethyl-acetate, [33%] with *tert*-Butyl peroxybenzoate, [33% and solvent]	2551	21	P1b P2d P8 UK1
	tert-Butyl peroxy-2-ethyl-hexanoate, [not more than 12%] with 2,2-Di-(*tert*-butylperoxy) butane, [not more than 14% with not less than 14% phlegmatiser and 60% inert inorganic solid]	2887		P1a
	tert-Butyl peroxy-2-ethyl-hexanoate, [not more than 30%] with 2,2-Di-(*tert*-butylperoxy) butane, [not more than 35%, with not less than 35% phlegmatiser]	2886	20	P1c
	tert-Butyl peroxy-2-ethyl-hexanoate, [not more than 50% with phlegmatiser]	2888	20	P1a UK1
(E)	*tert*-Butyl peroxy-2-ethyl-hexanoate, [technically pure]	2143	22	P1b P8 P18 UK1
(E)	*tert*-Butyl peroxy-isobutyrate, [more than 52% but not more than 77% in solution]	2142	20	P1c P18
	tert-Butyl peroxyisobutyrate, [not more than 52% in solution]	2562	20	P1c P18

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
(E)	*tert*-Butylperoxy isopropyl carbonate, [technically pure]	2103		P1c P13b UK1
	tert-Butyl peroxyneodecanoate, [technically pure]	2594	22	P1c
	tert-Butyl peroxyneodecanoate, [not more than 77% in solution]	2177	20	P1c
	3-*tert*-Butylperoxy-3-phenylphthalide [technically pure]	2596		P1a
(E)	*tert*-Butyl peroxypivalate, [not more than 77% in solution]	2110	20	P1b P8 UK1
	tert-Butyl peroxypivalate, [not more than 72% in solution]	3047	20	P1b P2d P8 UK1
	tert-Butyl peroxy-3,5,5-trimethylhexanoate (*tert*-Butyl peroxyisononanoate), [technically pure]	2104		P1a P2d P8 UK1
(E)	3-Chloroperoxybenzoic acid, [not more than 86% with 3-chlorobenzoic acid]	2755		P28
	Cumyl hydroperoxide (Cumene hydroperoxide), [technically pure]	2116	7	P1a P2c P8 P22b P25b
	Cumyl hydroperoxide (Cumene hydroperoxide) [not more than 95% in solution]	2116	7	UK2
	Cumyl peroxyneodecanoate [not more than 77% in solution]	2963	20	P1b P3b
	Cumyl peroxypivalate [not more than 77% in solution]	2964	20	P1c
	Cyclohexanone peroxide(s), [not more than 72% as a paste with not more than 9% available oxygen]	2896	11,21	P1a P2c P3b P6a P16 P22a P25b P30
	Cyclohexanone peroxide(s) [not more than 72% in solution with not more than 9% available oxygen]	2118	7,11,21	P1a P2c P3b P6a P8 P16 P20b P20d P22a P25b UK1
(E)	Cyclohexanone peroxide(s), [(1-Hydroxy-1′-hydroperoxy dicyclohexyl peroxide, technically pure or 1-Hydroxy-1′- hydroperoxy dicyclohexyl peroxide and Di-(1-hydroxy cyclohexyl) peroxide mixtures), more than 90% with water]	2117	11	P1c P12 P13b
	Cyclohexanone peroxide(s) [-Hydroxy-1′ hydroperoxy dicyclohexyl peroxide, technically pure or 1-Hydroxy-1′ hydroperoxy dicyclohexyl peroxide and Di-(1-hydroxy cyclohexyl) peroxide mixtures), not more than 90% with water]	2119	1,7	P1b P2d P8 UK1

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
	Diacetone alcohol peroxides, [not more than 57% in solution with not more than 9% hydrogen peroxide, not less than 26% diacetone alcohol and not less than 9% water; total active oxygen content, not more than 10%]	2163	7, 20	P1b UK1
	Diacetyl peroxide (Acetyl peroxide), [not more than 27% in solution (Dimethylphthalate or other approved phlegmatiser)]	2084	2, 20	P1b P8 UK1
(E)	Dibenzoyl peroxide, (Benzoyl peroxide) [more than 77% but less than 95% with water]	2088	1	P1d P13b
	Dibenzoyl peroxide, (Benzoyl peroxide), [not less than 30% but not more than 52% with inert solid]	2089	5,11	P1a P3b P6a P20b P20d
	Dibenzoyl peroxide, (Benzoyl peroxide), [not more than 72% as a paste]	2087	4,21	P1a P2c P3b P6a P16 P20a P20b P30 UK1
	Dibenzoyl peroxide (Benzoyl peroxide, [not more than 77% with water]	2090		P1b P2f P6b
(E)	Dibenzoyl peroxide, (Benzoyl peroxide, [technically pure or] Dibenzoyl peroxide, (Benzoyl peroxide), [more than 52% with inert solid]	2085	1, 3	P1g P1h P13a P14
	Dibenzyl peroxydicarbonate, [not more than 87% with water]	2149	1, 22	P1f P14 P20d
	Di-(4-*tert*-butyl cyclohexyl) peroxydicarbonate, [not more than 42%, stable dispersion, in water]	2894	22	P1a P20a P24
	Di-(4-*tert*-butylcyclohexyl) peroxydicarbonate, [technically pure]	2154	22	P1a P3b P6a P20c P20d
	Di-*tert*-butyl peroxide, (*tert*-Butyl peroxide), [technically pure]	2102		P1a P2c P8 P22b P25b UK1 UK2
	2,2-Di-(*tert*-butylperoxy) butane [not more than 55% in solution]	2111	21	P1a P2d P8 UK1
	1,1-Di-(*tert*-butylperoxy) cyclohexane, [not more than 40% with inert inorganic solid with not less than 13% phlegmatiser]	2885	21	P1a

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
	1,1-Di-(*tert*-butylperoxy) cyclohexane, [not more than 50% with phlegmatiser]	2897	21	P1a
(E)	1,1-Di-(*tert*-butylperoxy) cyclohexane, [not more than 77% in solution]	2180	21	P1c
(E)	1,1-Di-(*tert*-butylperoxy) cyclohexane, [technically pure]	2179	20	P1c
	Di-n-butyl peroxydicarbonate, (n-Butyl peroxydicarbonate), [not more than 27% in solution]	2170	20	P1b P8 P24 P25a UK1 UK2
	Di-n-butyl peroxydicarbonate, (n-Butyl peroxydicarbonate), [not more than 52% in solution]	2169	20	P1b
(E)	Di-sec-butyl peroxy-dicarbonate, [technically pure]	2150	16, 22	P1d
	Di-sec-butyl peroxydicarbonate, [not more than 52% in solution]	2151	20	P1b UK1
	1,4-Di-(2-*tert*-butylperoxy-isopropyl) benzene, [technically pure or] 1,4-Di-(2-*tert*-butyl-peroxy-isopropyl) benzene, [more than 40% with inert solid or] 1,3-Di-2-*tert*-butylperoxy-isopropyl) benzene, [technically pure or] 1,3-Di-(2-*tert*-butyl-peroxy-isopropyl) benzene, [more than 40% with inert solid or] 1,4-Di-(2-*tert*-butylperoxy-isopropyl) benzene and 1,3-Di-(2-*tert*-butylperoxyisopropyl) benzene mixtures, [technically pure or] 1,4-Di-(2-*tert*-butylperoxyisopropyl) benzene and 1,3-Di-(2-*tert*-butylperoxy-isopropyl) benzene mixtures, [more than 40% with inert solid]	2112	10	P1a P3b P6a P20c P20d P24 UK1
	Di-(*tert*-butylperoxy) phthalate, [not more than 55% as a paste]	2108	21	P1a P2c P3b P6a P16 P20c P20d P22a P25b UK1
	Di-2,4-dichlorobenzoyl peroxide, (2, 4-Dichlorobenzoyl peroxide) [not more than 52% in solution]	2139	21	P1b P2d P8 UK1
	Di-2,4-dichlorobenzoyl peroxide (2,4-Dichlorobenzoyl peroxide), [not more than 75% with water]	2137		P1b P6b
	Di-2-ethylhexyl peroxy-dicarbonate, [not more than 77% in solution]	2123	20	P1b P2d P8 UK1
	Di-2-ethylhexyl peroxy-dicarbonate, [not more than 45% in solution]	2123	20	UK2
	Di-(2-Ethylhexyl) Peroxydicarbonate, [not more than 42%, stable dispersion in water]	2960	22	P1a UK1
	Di-2-ethylhexyl peroxy-dicarbonate, [technically pure]	2122	22	P1b
	Diethyl peroxydicarbonate, [not more than 27% in solution]	2175	20	P1b

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
(E)	2-2-Dihydroperoxy propane, [not more than 25% with inert organic solid]	2178		P20d
	Di-(1-hydroxycyclohexyl) peroxide, [technically pure]	2148		P1a P3b P6a P14 P20c P20d
	Diisobutyryl peroxide [not more than 52% in solution]	2182	20	P1f
(E)	Diisopropyl peroxydicarbonate (Isopropyl peroxydicarbonate), [technically pure]	2133	13,20,14	P1h P7 P9 P13b P19b
	Diisopropyl peroxydicarbonate (Isopropyl peroxydicarbonate), [not more than 52% in solution]	2134	20	P1b P2d P8 UK1
	Diisotridecyl peroxydicarbonate, [technically pure]	2889	22	P1c
	Dilauroyl peroxide (Lauroyl peroxide), [not more than 42%, stable dispersion, in water]	2893		P1a P20a P24
	Dilauroyl peroxide, (Lauroyl peroxide), [technically pure]	2124		P1a P3b P6a P13a P14 P20b
(E)	Di-(2-methylbenzoyl) peroxide, [not more than 85% with water]	2593	22	P1b
(E)	2,5-Dimethyl-2,5-di-(benzoyl peroxy) hexane, [not more than 82% with inert solid]	2173	14,17	P1d P3b P6a P20c P20d P21
	2,5-Dimethyl-2,5-Di-(benzoylperoxy) hexane, [not more than 82% with water]	2959		P1c
(E)	2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, [technically pure]	2172	14,17	P1d P3b P6a P20c P20d P21
	2,5-Dimethyl-2,5-di-(*tert*-butylperoxy) hexane, [not more than 52% with inert solid]	2156		P1a
	Di-(*tert*-butylperoxy) phthalate [not more than 55% in solution	2107	21	P1a P2c P8 P22a P25b UK1
(E)	Di-(*tert*-butylperoxy) phthalate, [technically pure]	2106		P1a
	2,2-Di-(*tert*-butylperoxy) propane, [not more than 40% with inert inorganic solid with not less than 13% phlegmatiser]	2884	21	P1a

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Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
2,2-Di-(*tert*-butylperoxy) propane, [not more than 50% with phlegmatiser]	2883	21	P1a
1,1-Di-(*tert*-butylperoxy)-3,3,5-trimethyl cyclo-hexane, [not more than 57% in solvent]	2146	21	P1a P8
1,1-Di-(*tert*-butylperoxy)-3,3,5-trimethyl cyclo-hexane, [not more than 58% with inert solid]	2147		P1a UK1
1,1-Di-(*tert*-butylperoxy)-3,3,5-trimethyl cyclo-hexane [technically pure]	2145		P1c P18
Dicetyl peroxydicarbonate, [not more than 42%, stable dispersion, in water]	2895	22	P1a P20a P24 UK1
Dicetyl peroxydicarbonate, [technically pure]	2164	22	P1a P2c
Di-4-chlorobenzoyl peroxide, (p-Chlorobenzoyl peroxide), [not more than 52% as a paste]	2114	11,21	P1a P2c P3b P6a P16 P20c P20d UK1
Di-4-Chlorobenzoyl peroxide, (p-Chlorobenzoyl peroxide), [not more than 52% in solution]	2115	11,21	P1b P2d P8 UK1
Di-4-chlorobenzoyl peroxide, (p-Chlorobenzoyl peroxide), [not more than 75% with water]	2113	11	P1b P2f P6b
Dicumyl peroxide, [technically pure or] Dicumyl peroxide [with inert solid]	2121	19	P1a P2a P24
Dicyclohexyl peroxydicarbonate [not more than 91% with water]	2153	1,22	P1b
(E) Dicyclohexyl peroxydicarbonate [technically pure]	2152	1,22	P1d P14 P20d
Didecanoyl peroxide, (Decanoyl peroxide), [technically pure]	2120	22	P1a P2c P3b P6a P17 P20b P24 P25a
2,2-Di-(4,4-di-*tert*-butylperoxycyclohexyl) propane, [not more than 42% with inert solid]	2168		P1a
Di-2,4-dichlorobenzoyl peroxide, (2,4-Dichlorobenzoyl peroxide), [not more than 52% as a paste]	2138	21	P1a P2c P3b P6a P16 P20b P20d P30
2,5-Dimethyl-2,5-di-(*tert*-butylperoxy) hexane, [technically pure]	2155		P1a P8 P18 UK1

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
	2,5-Dimethyl-2,5-di-(*tert*-butylperoxy) hexyne-3, [not more than 52% with inert solid]	2159		P1a
(E)	2,5-Dimethyl-2,5-di-(*tert*-butylperoxy) hexyne-3, [technically pure]	2158		P1c P18
	2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy) hexane, [technically pure]	2157	22	P1b P18
(E)	2,5-Dimethyl-2,5-dihydroperoxy hexane, (Dimethylhexane dihydroperoxide), [not more than 82% with water]	2174	1	P1d P12
	Dimyristyl peroxydicarbonate, [not more than 42%, stable dispersion, in water]	2892	22	P1a P20a P24
	Dimyristyl peroxydicarbonate, [technically pure]	2595	22	P1a
	Di-n-nonanoyl peroxide, (Pelargonyl peroxide), [technically pure]	2130	22	P1a P2c P3b P6a
	Di-n-octanoyl peroxide, (n-Octanoyl peroxide), [technically pure]	2129	22	P1a P2c P3b P6a P24 P25a
	Diperoxy azelaic acid, [not more than 27% with not less than 13% azelaic acid and not less than 53% sodium sulphate]	2958	22	P1a
	Dipropionyl peroxide, (Propionyl peroxide) [not more than 28% in solution]	2132	20	P1b P2d P8 P24 P25a UK1
(E)	Di-n-propyl peroxydicarbonate, [technically pure]	2176	1,14,22	P1d P19a
	Distearyl peroxydicarbonate [not more than 85% with stearyl alcohol]	2592		P1a
	Disuccinic acid peroxide, [not more than 72%, wetted with water]	2962	1,22	P1a P13b P14 P15
(E)	Disuccinic acid peroxide, (Succinic acid peroxide), [technically pure]	2135	1,15	P1d P13b P14 P15
	Di-(3,5,5-trimethyl-1,2-dioxolanyl-3) peroxide, [not more than 50% as a paste with phlegmatiser]	2597	20	P1c
	Di-(3,5,5-trimethylhexanoyl) peroxide, (Isononanoyl peroxide) [technically pure or] Di-(3,5,5-trimethylhexanoyl) peroxide (Isononanoyl peroxide) [in solution]	2128	20	P1b P2d P8 P18 P24 P25a UK1
	Di-(3,5,5-trimethylhexanoyl) peroxide (Isononanoyl peroxide) [not more than 40% in solution]	2128	20	UK2

	Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
	Ethyl 3,3-di-(*tert*-butylperoxy) butyrate, [not more than 50% with inert inorganic solid]	2598		P1a
	Ethyl 3,3-di-(*tert*-butylperoxy) butyrate, [not more than 77% in solution]	2185	21	P1c P8
(E)	Ethyl 3,3-di-(*tert*-butylperoxy) butyrate, [technically pure]	2184		P1c P8
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxocyclononane, [not more than 52% in solution]	2167	21	P1a P8
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxocyclononane, [not more than 52% with inert solid]	2166		P1a
(E)	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxocyclononane,, [technically pure]	2165	1	P1d
	Isopropylcumyl hydroperoxide, (Diisopropylbenzene hydroperoxide), [not more than 72% in solution]	2171	21	P1a P2c P8 P22b P25c UK1
	p-Menthyl hydroperoxide, (p-Menthane hydroperoxide), [technically pure]	2125	7	P1a P2c P8 P22b P25c UK1
	p-Menthyl hydroperoxide (p-Menthane hydroperoxide) [not more than 95% in solution]	2125	7	UK2
	Methylcyclohexanone peroxide(s), [not more than 67% in solution]	3046	20	P1a
	Methyl ethyl ketone peroxide(s), [not more than 50% in solution with more than 10% available oxygen]	2563	21	P1a P1c P8 UK1
	Methyl ethyl ketone peroxide(s), [not more than 50% in solution with not more than 10% available oxygen]	2550	21	P1a P8 UK1
(E)	Methyl ethyl ketone peroxide(s) [not more than 60% in solution]	2127	21	P1a P8 UK1
	Methyl isobutyl ketone peroxide, [not more than 62% with phlegmatiser or] Methyl isobutyl ketone peroxide [not more than 62% with 20% methyl methyl isobutyl and 20% phlegmatiser]	2126	12,21	P1a P2d P8 UK1
	Organic peroxides; mixtures	2756	18	
	Organic peroxides, samples, n.o.s.	2255		P1i
	Peroxyacetic acid, [not more than 16% in a mixture with at least 39% water, at least 15% acetic acid, not more than 24% hydrogen peroxide, 0.5 to 1% stabiliser containing no or not more than 1% sulphuric acid]	3045		P1a P2a P24 P26b UK1
	Peroxyacetic acid, [not more than 43% in acetic acid, or]Peroxyacetic acid [in a mixture of acid and water, with not more than 6% hydrogen peroxide and not more than 1% sulphuric acid]	2131	7	P1c P3a UK1 UK2

Name and description *1*	*Substance Identification Number* *2*	*Special provisions* *3*	*Recommended Packagings* *4*
Pinanyl hydroperoxide (Pinane hydroperoxide), [technically pure]	2162	7	P1a P2c P8 P22b P24 P25c
Pinanyl hydroperoxide (Pinane hydroperoxide) [not more than 95% in solution]	2162	7	UK2
Tetrahydronaphthyl hydroperoxide, (Tetralin hydroperoxide), [technically pure]	2136	7	P1a P2c P22a P25b
1,1,3,3-Tetramethylbutyl hydroperoxide, (*tert*-Octyl hydroperoxide), [technically pure]	2160		P1c P18
1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate, (*tert*-Octyl peroxy-2-ethylhexanoate), [technically pure]	2161	7,22	P1c P18
2,4,4-Trimethylpentyl-2-Peroxy Phenoxy Acetate, [not more than 37% in solution]	2961	20	P1a

Appendix 1B List of special provisions for organic peroxides

1 This substance is either explosive or would become so if allowed to dry. It is considered that leakage, with consequent increase in sensitivity because of drying and hence increased risk of initiation, presents a greater hazard than any possible increase in the risk of explosion due to extra confinement which may result from the employment of strong packagings.

2 The attention of all those concerned with the carriage of this substance should be drawn to the special risk of damage to the eyes even after brief contact. It is considered that this action provides a sufficient safeguard and no special packaging requirements are necessary.

3 Benzoyl peroxide technically pure or more than 95% with inert solid; inner packagings not to exceed 500 gr (17.5 oz) net.

4 Packing method P20a is acceptable only for a maximum 55% product.

5 Exempt if less than 35.5% with finely ground starch, calcium sulphate dihydrate or dicalcium phosphate dihydrate.

6 Deleted .

7 Any extra confinement which might result from the employment of strong packagings would not be sufficient to cause a significant risk of explosion for this substance.

8 Packing method P24 should be used only where the substance is in a solvent.

9 No aluminium tanks should be used for this substance.

10 Exempt if containing 60% or more inert solid and in packages containing not more than 200 kg in the whole package.

11 Exempt if containing not less than 70% inert solid.

12 There are no data available on this substance. The recommendation has been made by analogy with methyl ethyl ketone peroxide.

13 It is recommended that this substance be transported inside a thermally insulated box which is the refrigerated package which minimizes risks arising from leakage.

14 Metal inner and outer packagings which fully enclose the organic peroxide are not allowed.

15 Addition of water to this organic peroxide will decrease its thermal stability.

16 There are insufficient data available on this substance. The recommendation has been made by analogy with the properties of similar substances.

17 The explosive properties of this substance are such that it would be expected to display non-explosive behaviour when contained in non-metallic packagings but, as far as is known, this has not yet been experimentally verified. (Bonfire tests recommended.)

18 The mixture should consist only of listed organic peroxides.

19 Exempt if containing not less than 60% inert solid.

20 To ensure safety during road conveyance of these organic peroxides it may be necessary to transport them at temperatures below ambient. The following diluents are appropriate for desensitisation:- organic liquids which are compatible with the organic peroxide in question and have a boiling point less than 150°C but not less than 60°C and a flash point not less than 5°C. The boiling point of the diluent should be at least 50°C higher than that temperature below ambient at which it may be necessary to transport the organic peroxide to ensure its safe road conveyance.

21 The following diluents are appropriate for desensitisation:-
organic liquids which are compatible with the organic peroxide in question and which have a boiling point not less than 150°C.

22 To ensure safety during road conveyance of these organic peroxides it may be necessary to transport them at temperatures below ambient.

23 If carried in a tank container or intermediate bulk container, the vessel should be insulated to such a degree that in a one hour fire engulfment situation the temperature of the peroxide in the vessel will not exceed 50°C.

Appendix 1C List of recommended packagings

Packaging number	*Description of packaging*	*Maximum contents of inner receptacle*	*Maximum contents of whole package*
P1a	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	50 kg	50 kg
P1b	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	25 kg	50 kg
P1c	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	10 kg	50 kg
P1d	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	5 kg	50 kg
P1e	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	25 kg	25 kg
P1f	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	6 kg	25 kg
P1g	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	5 kg	5 kg
P1h	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	1 kg	10 kg
P1i	Plastics bottles, jars, bags or boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	500 g	1 kg
P2a	Plastics bottles, jars, bags or boxes packed in a metal drum or metal box	100 kg	100 kg
P2c	Plastics bottles, jars, bags or boxes packed in a metal drum or metal box	50 kg	50 kg
P2d	Plastics bottles, jars, bags or boxes packed in a metal drum or metal box	25 kg	50 kg
P2f	Plastics bottles, jars, bags or boxes packed in a metal drum or metal box	10 kg	50 kg
P3a	Plastics bottle or drum individually packed in a fitted fibreboard box, fibreboard drum, plywood drum or in a metal crate	—	60 kg
P3b	Plastics bottle or drum individually packed in a fitted fibreboard box, fibreboard drum, plywood drum or in a metal crate	—	30 kg
P6a	Metal cans or glass bottle, plastics bags or plastics receptacles in metal cans packed together in a fibreboard box, fibreboard drum plywood drum or wooden box	10 kg	90 kg
P6b	Metal cans or glass bottle, plastics bags or plastics receptacles in metal cans packed together in a fibreboard box, fibreboard drum, plywood drum or wooden box	10 kg	50 kg
P7	Receptacles made of aluminium of at least 99.5% purity, closed with a plastics lid, packed in a fibreboard, wooden or metal box or a fibreboard, plywood or metal drum	3 kg	12 kg
P8	Glass bottles packed with cushioning material in a fibreboard box, fibreboard drum, plywood drum or wooden box	2 l	50 kg

Packaging number	*Description of packaging*	*Maximum contents of inner receptacle*	*Maximum contents of whole package*
P9	Glass, metal or earthenware receptacles packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	7.5 l	7.5 l
P10	Glass bottles packed with cushioning material in a metal box or metal drum	0.5 l	50 kg
P12	Waxed fibreboard boxes packed in a fibreboard box, fibreboard drum, plywood drum or wooden box	1 kg	50 kg
P13a	Fibreboard or plastics boxes or receptacles or plastics bottles, packed in a fibreboard box with a fire-retardant liner and nest cell partitions of fire-retardant corrugated fibreboard or packed in a stout compartmented wooden box (egg box style)	500 kg	25 kg
P13b	Fibreboard or plastics boxes or receptacles or plastics bottles, packed in a fibreboard box with a fire-retardant liner and nest cell partitions of fire-retardant corrugated fibreboard or packed in a stout compartmented wooden box (egg box style)	500 g	14 kg
P14	Paper bags with an inner ply of plastics securely closed, packed in a fibreboard box with a fire-retardant liner and nest cell partitions of fire-retardant corrugated fibreboard	500 g	25 kg
P15	Paper bag with an inner ply of plastics, securely closed, packed with incombustible cushioning material in a fibreboard box	—	500 g
P16	Metal or plastics flexible tubes in a compartmented fibreboard or plywood box	250 g	50 kg
P17	Fibre receptacle with cap closure, tape-sealed in a wooden box with fire retardant cushioning material	—	500 g
P18	Plastics bottle with a non-vented closure wrapped in incombustible cushioning material and individually packed in a fibreboard box	—	500 ml
P19a	Plastics bottles, jars or boxes or aluminium boxes or stainless steel trays in a thermally insulated outer box	5 kg	400 kg
P19b	Plastics bottles, jars or boxes or aluminium boxes or stainless steel trays in a thermally insulated outer box	2 kg	545 kg
P20a	Fibreboard drum coated internally with polythene or fitted with a plastics liner	—	200 kg
P20b	Fibreboard drum coated internally with polythene or fitted with a plastics liner	—	100 kg
P20c	Fibreboard drum coated internally with polythene or fitted with a plastics liner	—	50 kg
P20d	Fibreboard drum with a moisture barrier	—	30 kg
P21	Plywood drum with plastics liner	—	50 kg
P22a	Steel drum	—	50 kg
P22b	Steel drum	—	220 l
P24	Steel drum with plastics inner receptacle or liner	—	220 l
P25a	Aluminium drum	—	200 kg
P25b	Aluminium drum	—	50 kg
P25c	Aluminium drum	—	220 l
P28	Strong plastics bags individually packed in a 2 l round cardboard carton, four cartons per each outside fibreboard case	500 g	2 kg
P30	Plastics receptacle with full removable head	—	25 kg
UK1	Free standing rigid plastics receptacle	—	25 kg
UK2	Purpose designed and constructed tank container or intermediate bulk container with appropriate fittings	3,000 l	3,000 l

Appendix 2 Comparison with international recommendations or rules

1 Although more general in its nature, the advice given in this Code is based on the United Nations Recommendations on the Transport of Dangerous Goods and is, by that means, made as consistent as is possible with the International Rules. For the most part, the advice is couched so as to use terms as defined in those Recommendations but there are some variations which it is useful to bear in mind. The definitions given in Regulation 2(1) which relate to the packaging of dangerous substances also serve to give meaning to the labelling provisions made for supply and conveyance by road, and to the derogations then made from labelling.

2 As defined in the UN Recommendations, ''packages are the complete product of the packing operation, consisting of the packaging and its contents prepared for transport''; the definition is not taken to include a pallet or other unit load device and differs in that respect from the definition given in Regulation 2(1). In both instances, however, it is the packaging or packagings which fulfil the required containment function and which ensure there will be no leakage, in normal handling, from the package as prepared for, and liable to be individually handled during the course of conveyance. The use of a pallet or other unit load device must be considered in relation to the suitability of a package for the purpose of conveyance by road.

3 The definition for receptacle given in Regulation 2(1) is very similar in effect to the definition given in the UN Recommendations, ie ''receptacles are containment vessels for receiving and holding substances ....., including any means of closing''. But whereas those recommendations reserve the term receptacle to describe a vessel which requires additional packagings in order to fulfil its containment function during conveyance, and it is convenient to reflect that usage in this Code, the term does have added usage in the Regulations themselves. In the Regulations the term receptacle has been retained to describe a single vessel which can safely be conveyed alone and so meets the definitions also given for packagings and package.

4 The term packagings, as used in this Code and in the UN Recommendations, has general currency to describe any arrangement of receptacle and, where necessary, any other components or materials which enable it to perform its containment function. However other associated terms which need to be given a very precise meaning within the UN Recommendations to support the detailed design or testing provisions (for example: inner, outer, combination, or composite packagings) do not need to be so defined for the purposes of the Regulations or this Code. Qualifications attached to the term packagings, such as innermost, inner, associated or outer merely indicate the relative parts of a package. It will be clear from the context when the advice given is applicable to any package, to a particular form of package or to a specific part of a package.

5 The recommendations made in Part 1 of this Code have been drafted to have application to all packages within the scope of the Regulations. The more detailed UN Recommendations on the other hand, do not cover packages whose net mass exceeds 400 kg or packagings with a capacity exceeding 450 litres.

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